Ishaan Shrivastava

Noida, Uttar Pradesh
201301

Links: **Github** **LinkedIn** **Codeforces**
Portfolio-Website
ishaanshri95@gmail.com

Education

Indian Institute of Technology, Jodhpur November '20 – May '24
B.Tech in Artificial Intelligence and Data Science - CGPA 8.1 / 10 *Jodhpur, Rajasthan, India*

Publications

Learn "No" to Say "Yes" Better: Improving Vision-Language Models via Negations (cited by 54) *arXiv - GitHub*
Jaisidh Singh, **Ishaan Shrivastava***, Mayank Vatsa, Richa Singh, Aparna Bharati* *Published - WACV2025*

Work Experience

Senior Engineer I - Computer Vision & Research Sep '26 – Present
Retearn Technologies (Recykal Group) [Supervisor: Sanket Waghmare] *Hyderabad, India*

- Research and development of **computer vision systems for automated waste identification and sorting**, spanning material classification, object recognition, and open-set detection in reverse vending machines and industrial recycling systems.
- Developing **low-latency edge AI inference pipelines** for resource-constrained embedded hardware, with emphasis on model optimization, quantization, hardware acceleration, and accuracy–latency–power trade-offs.
- Working across **camera systems, multispectral imaging, data pipelines, and model deployment**, collaborating with embedded systems, hardware, and product engineering teams to integrate AI into physical recycling systems.

Computer Vision Research Engineer May '24 – July '26
Metafusion [Supervisor: Aman Kumar Mallik] *Noida, India*

- **Dashcam Monitoring System for NHAI (National Highway Operations &Management)** Developed extremely resource-efficient comprehensive AI analytics backend which includes detection of potholes, rutting, and severe cracking, as well as damaged or faded lane markings, among 35 total categories of road defects. **Deployed across 40,000 kilometres of national highways.**
- Boosted person-detection pretraining over SOTA by 2% with a scalable dataset curation, aggregation and selection pipeline. The improved object detecter obtained a **60% speedup over the previous solution**. Implemented custom data pipeline on an ultralytics fork allowing for **15x increased throughput in training runs** on available hardware, allowing thousands of iterative ablations within a single month.
- Accelerated VLM deployment via **data-free structured pruning** method for attention-layer skipping in VLMs, based on **heavy-tailed self-regularization theory (HTSR)**

Open source engineer May '23 – Aug '23
CodeForGovTech '23 [Supervisor: Gautam Rajeev] *Remote*

- **shrivastava95/docparser** Built a CLIP-guided language routing system for Tesseract OCR, reducing language selection errors from 13% to 2% on multilingual documents. Open-Sourced docparser, a multilingual document parsing system supporting 116 languages and 37 scripts.
- **Samagra-Development/ai-tools (PR #102)** Dictionary-based augmentations for Azure Odia translation, improving translation robustness in transformer-based models.
- Collaborated with supervisors for successful deployment of **shrivastava95/docparser**, positively impacting and **deployed across millions of farmers** to provide language translations in regional dialects.

Undergraduate researcher May '23 – Aug '23
Supervisor: Dr. Shweta Jain *Ropar, Punjab, India*

- Improving fairness in non-i.i.d federated classification settings using knowledge distillation, EMA, and stochastic weight averaging. Rewrote the Ditto **federated learning** framework, from TensorFlow to PyTorch, ran ablations achieving an improvement of 0.2%.

Projects

SparseRNN

Supervisor: Prof. Richa Singh, Mayank Vatsa

- **GitHub shrivastava95/sparsernn** Implemented SparseRNN, an RNN with exponentially dilated temporal connectivity with subquadratic complexity, as an alternative to dense transformer decoder.
- Showed pareto improvements over LSTM, RNN, and dense transformer baselines on three tasks - Sequential MNIST classification, IMDB sentiment classification, Penn Treebank Part-of-Speech tagging

Hierarchical Reasoning Model (HRM)

Supervisor: self

- **GitHub shrivastava95/HRM-minimal** Minimal implementation of Hierarchical Reasoning Models, a cognition-inspired novel recurrent architecture that executes sequential reasoning tasks like Sudoku and ARC-AGI in a single forward pass without explicit supervision of the intermediate process, beating LLMs more than 1000x larger such as Claude Sonnet 3.7, OpenAI o3-mini, etc.

DevRev Expert Answers in a Flash: Improving Domain-Specific QA Dec '23 – Jan '23

Supervisor: Self

- **Google Colab** Document retrieval, extractive QA pipeline using RoBERTA in low-resource settings.
- Reduced retrieval + QA pipeline latency below 700 ms per query.

Self-Supervised robust Adversarial Attack Detection Jan '23 – Jan '23

Supervisor: Prof. Richa Singh, Prof. Mayank Vatsa

- **GitHub shrivastava95/dependable-ai** Implemented an Autoencoder to maximise the reconstruction error of adversarially attacked samples by implementing a self-supervised triplet loss objective by mimicing the behaviour of attacked samples.

Skills and Technologies

Machine Learning: PyTorch, Jax, einops, Numpy, OpenCV, Ultralytics, HuggingFace, ONNX, Docker
Programming Languages: Python, Bash, C++/C, MATLAB, JavaScript
Agentic Tools: dsPy, LangGraph, LangChain, Codex, Claude Code, Hermes Agent

Coursework

Machine Learning, Deep Learning, Artificial Intelligence, Dependable AI, Probability & Statistics, Stochastic Processes, Optimization for Machine Learning, Game Theory, Financial Engineering, Data Structures & Algorithms, Operating Systems, Computer Networks.

Positions of Responsibility

Core Member - Programming Club, IIT Jodhpur August '22 – May '24

- Coordinator, Programming Club; Problemsetter, Tech Fest (Prometeo) at IIT Jodhpur

Other Interests

Avid chess player, origami enthusiast, and active competitive programmer. I thrive when given clear, precise instructions and goals, and under the pressure of competition.

Achievements

Expert at Codeforces - Reached 'Expert' (rating 1749, 7 months, 33 contests) – top 7 % on Codeforces. All-India-Rank 1438 in JEE Mains 2020, All-India-Rank 3231 in JEE Advanced 2020. Was Awarded **International Rank 11** in SOF olympiad (2014)